

# TREMATODES (FLUKES)

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- These leaf-shaped worms are parasitic to humans and animals.
- Have complex life cycles may involve one or more intermediate hosts, often freshwater molluscs.
- Schistosomiasis is a major cause of morbidity in the tropics.
- The species commonly causing disease in humans are:-
  - *Schistosoma haematobium*.
  - *S. mansoni*.
  - *S. japonicum*.
  - *S. mekongi*.
  - *S. intercalatum*.
- *S. haematobium* is sometimes called bilharzia or bilharziasis.
- Schistosome eggs have been found in Egyptian mummies.

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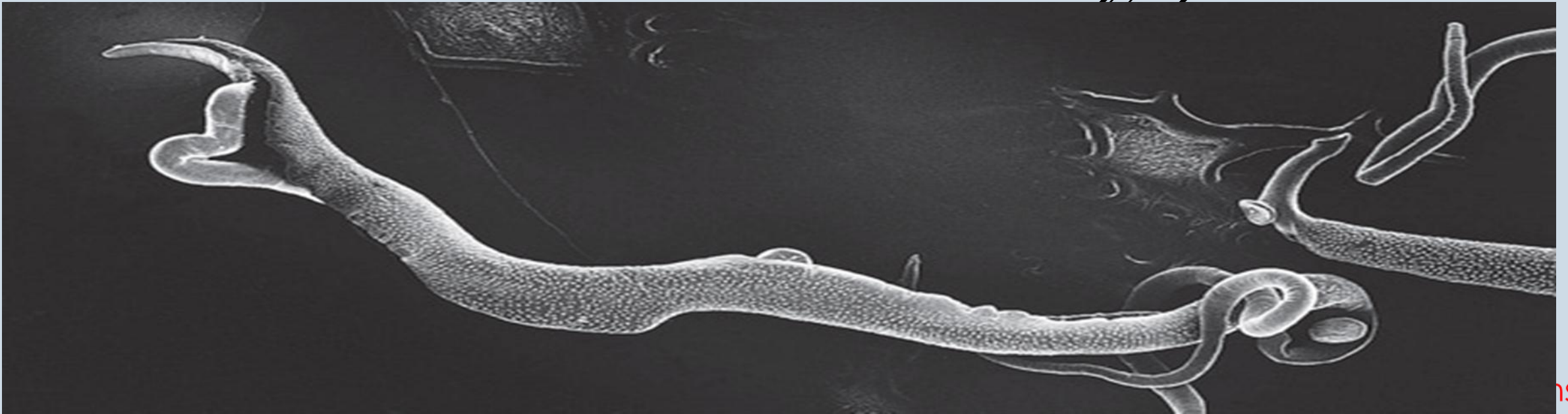
## Schistosomiasis

- The ovum is passed in the urine or faeces of infected individuals and gains access to fresh water, where the ciliated miracidium inside it is liberated.
- The miracidium enters its intermediate host, a species of freshwater snail, and multiplies.
- Large numbers of fork-tailed cercariae are then liberated into the water, where they may survive for 2–3 days.
- Cercariae can penetrate the skin or the mucous membrane of the mouth of humans.
- They transform into schistosomula and moult as they pass through the lungs.

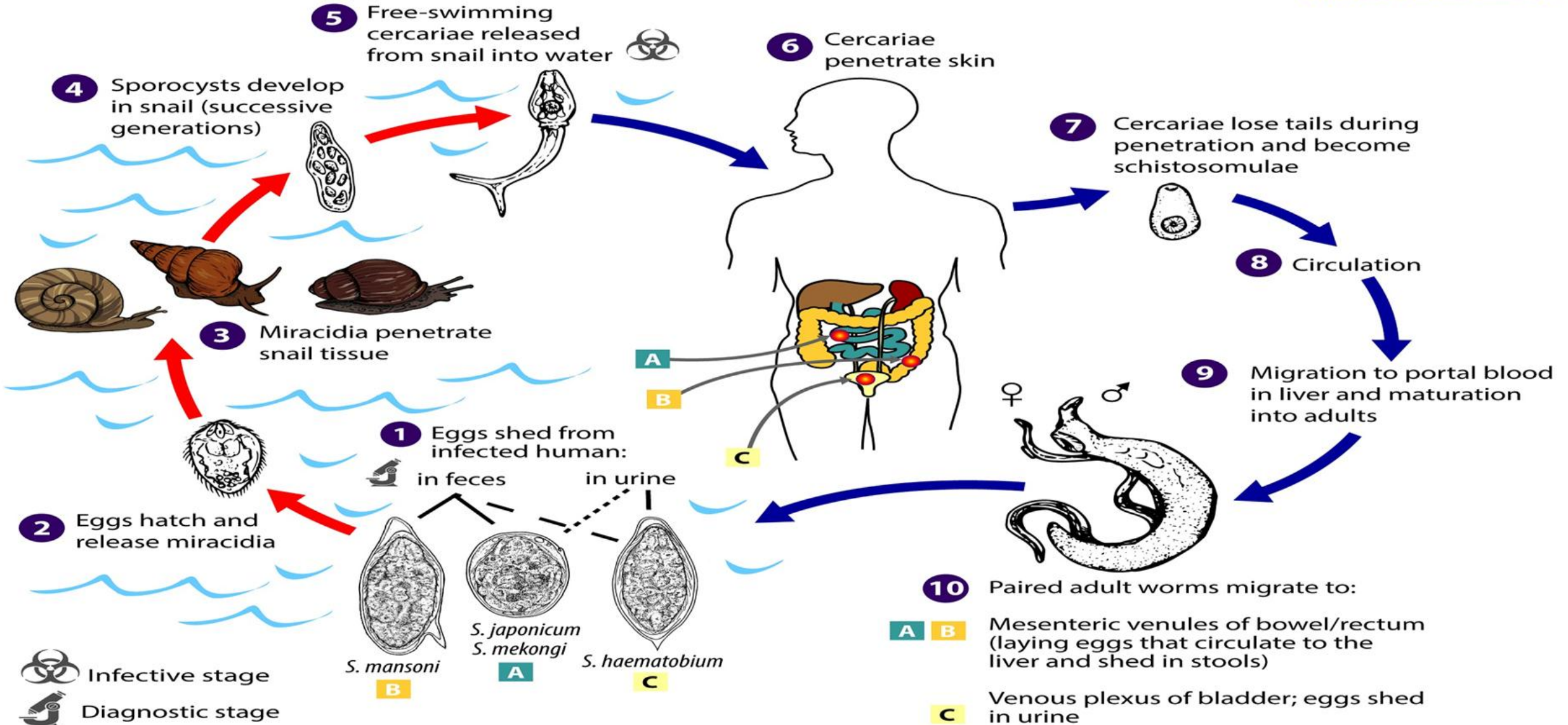
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## Schistosomiasis

- Are carried by the blood stream to the liver, and so to the portal vein, where mature.
- The male worm is up to 20 mm in length and the more slender cylindrical female, usually enfolded longitudinally by the male, is longer.
- Within 4–6 weeks of infection, they migrate to the venules draining the pelvic viscera, where the females deposit ova.

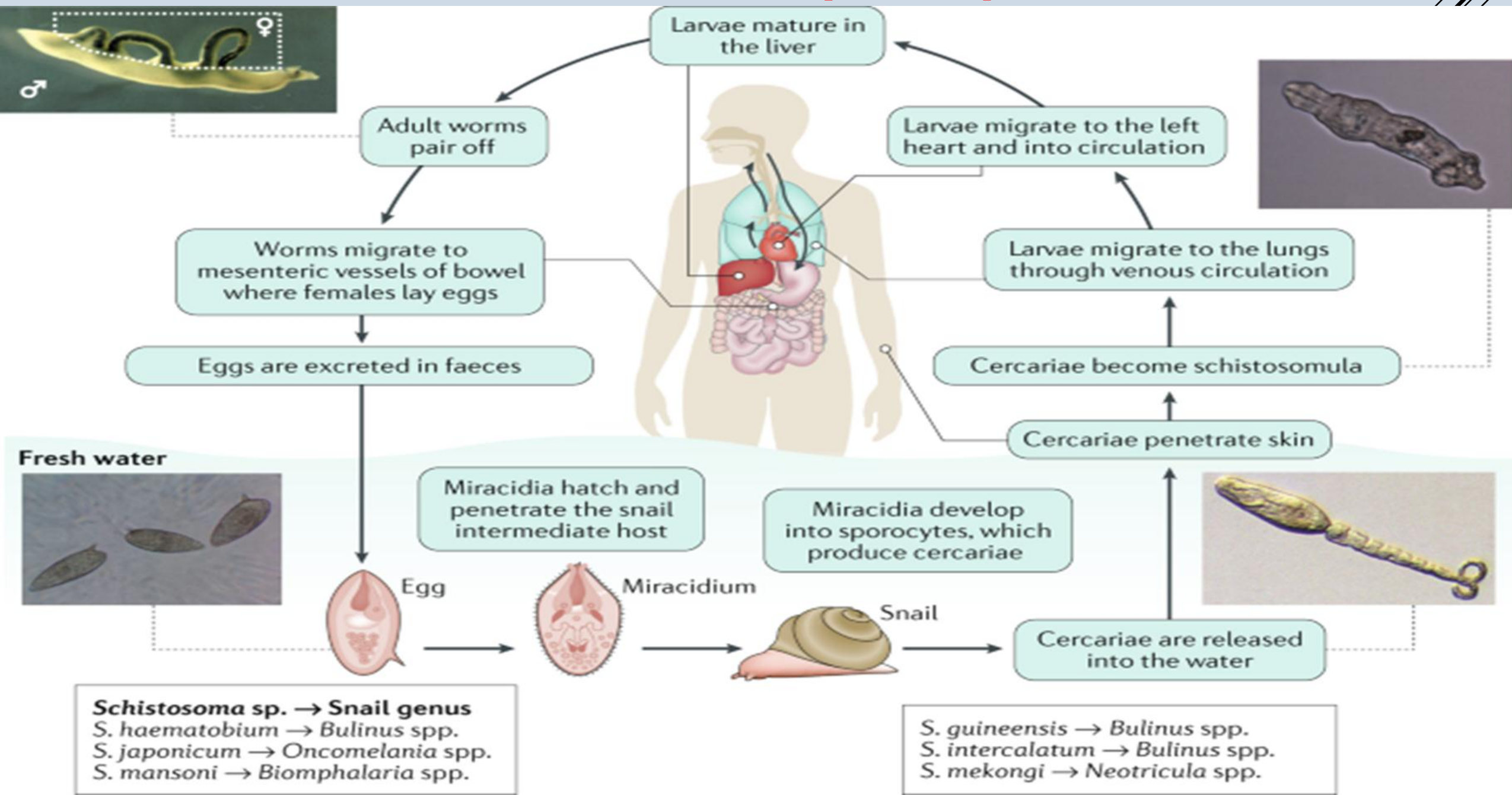


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## Schistosomiasis

### ❖ Pathology :-

- Disease is usually due to passage of eggs through mucosa and to the granulomatous reaction to eggs deposited in tissues.
- The eggs of *S. haematobium* pass mainly through the bladder wall but may also involve the rectum, seminal vesicles, vagina, cervix and uterine tubes.
- *S. mansoni* and *S. japonicum* eggs pass mainly through the wall of the lower bowel or are carried to the liver.
- The most serious, but rare, site of ectopic egg deposition is the CNS.
- Granulomas are composed of macrophages, eosinophils, and epithelioid and giant cells around an ovum.

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## Schistosomiasis

### ❖ Pathology :-

- Later, is fibrosis and eggs calcify, which is often visible radiologically.
- Eggs of *S. haematobium* may leave the vesical plexus and be carried directly to the lung.
- Eggs of *S. mansoni* and *S. japonicum* may also reach the lungs after the development of portal hypertension and consequent portosystemic collateral circulation.
- Egg deposition in the pulmonary vasculature, and the resultant host response, can lead to pulmonary hypertension.



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## Schistosomiasis

### ❖ Clinical features :-

- Recent travelers with history of fresh water exposure in an endemic area, may present with allergic manifestations and eosinophilia.
- Residents of schistosomiasis-endemic areas are more likely to present with chronic urinary tract pathology or portal hypertension.
- Clinical features includes the following ;
  - A ) Cercarial dermatitis ('swimmer's itch').
    - During the early stages of infection.
    - Characterized by localized erythema develops in some individuals, which can progress to a pruritic maculopapular rash.
    - Persists for some days, at the site of cercarial penetration.

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## Schistosomiasis

### ❖ Clinical features :-

#### B ) Acute schistosomiasis (Katayama syndrome)

- A febrile illness may develop 3-5 weeks after exposure in persons without prior infection.
- Acute schistosomiasis (Katayama syndrome) may present with allergic manifestations, such as urticaria, fever, muscle aches, abdominal pain, headaches, cough and sweating.
- Common and severe in infections with *S. mansoni* and *S. japonicum*, but are rare with *S. haematobium*.
- Acute schistosomiasis usually resolves in 1–2 weeks.

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## Schistosomiasis

### ❖ Clinical features :-

➤ On examination my present :-

✓ Hepatomegaly.

✓ Splenomegaly.

✓ Lymphadenopathy.

✓ Pneumonia.

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## Schistosomiasis

### ❖ Clinical features :-

#### C ) Chronic schistosomiasis

- Chronic schistosomiasis is due to egg deposition and occurs months to years after infection.
- The symptoms and signs depend on the intensity of infection and the species of infecting schistosome.
- ❖ A symptomatic in many infected persons who have light infections
- ❖ A symptomatic infected children may suffer from anemia and growth retardation.
- ❖ Symptoms up to 50-60%.
- ❖ Symptoms of advanced organ damage in 5-10% of infected person's.

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## Schistosomiasis

### ❖ *Schistosoma haematobium*

- Humans are the only natural hosts of *S. haematobium*.
- Highly endemic in Egypt, East Africa, and occurs throughout Africa and the Middle East.
- Infection can be acquired after a brief exposure, such as swimming in freshwater.
- Painless terminal hematuria is usually the first and most common symptom.
- Frequency of micturition follows, due to bladder neck obstruction.



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## Schistosomiasis

### ❖ *Schistosoma haematobium*

- Pain is often felt in the iliac fossa or in the loin, and radiates to the groin.
- Later, frequent urinary tract infections, bladder or ureteric stones, hydronephrosis.
- Ultimately renal failure with a contracted calcified bladder may occur.
- In endemic areas, is a strong association of *S. haematobium* infection with squamous cell carcinoma of the bladder.
- Disease of the seminal vesicles may lead to haematospermia.

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## Schistosomiasis

### ❖ *Schistosoma haematobium*

- Females may develop schistosomal papilloma's of the vulva, and schistosomal lesions of the cervix may be mistaken for cancer.
- Intestinal symptoms may follow involvement of the bowel wall.
- Ectopic worms cause skin or spinal cord lesions.
- The severity of *S. haematobium* infection varies greatly and many with a light infection are asymptomatic.
- However, as adult worms can live for 20 years or more and lesions may progress, these patients should always be treated.

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## Schistosomiasis

### ❖ *Schistosoma mansoni*

- Endemic in Africa, the Middle East, Venezuela, Brazil and the Caribbean.
- Symptoms begin 2 months or more after infection.
  - May be slight malaise or consist of abdominal pain and frequent stools that contain blood-stained mucus.
  - In severe advanced disease, increased discomfort from rectal polyps may be experienced.
  - The early hepatomegaly is reversible.
  - Portal hypertension may cause massive splenomegaly, fatal hematemesis from esophageal varices, or progressive ascites.
  - Liver function is initially preserved because the pathology is fibrotic rather than cirrhotic.
- *S. mansoni* and other schistosome infections predispose to the carriage of *Salmonella*, in part because *Salmonella* may attach to the schistosomes and in part because shared antigens on schistosomes.

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## Schistosomiasis

### ❖ *Schistosoma japonicum*, *S. mekongi* and *S. intercalatum* :-

- *S. japonicum* and other *Schistosoma* spp can infects species other than humans.
- Non-human reservoir seems to be particularly important only in transmission for *S. japonicum*.
- *S. japonicum* is prevalent in the Yellow River and Yangtze–Jiang basins in China, It also has a focal distribution in the Philippines, Indonesia and Thailand.
- *S. mekongi* occurs in Laos, Thailand and Myanmar.
- *S. intercalatum* in West and Central Africa.

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## Schistosomiasis

❖ **Schistosoma japonicum, S. mekongi and S. intercalatum :-**

- The pathology of *S. japonicum* is similar to that of *S. mansoni*, but as this worm produces more eggs, the lesions tend to be more extensive and widespread.
- The clinical features resemble those of severe infection with *S. mansoni*, with added neurological features.
- The small and large bowel may be affected, and hepatic fibrosis with splenic enlargement is usual.
- Deposition of eggs or worms in the CNS, especially in the brain or spinal cord, causes symptoms in about 5% of infections, notably epilepsy, blindness, hemiplegia or paraplegia.

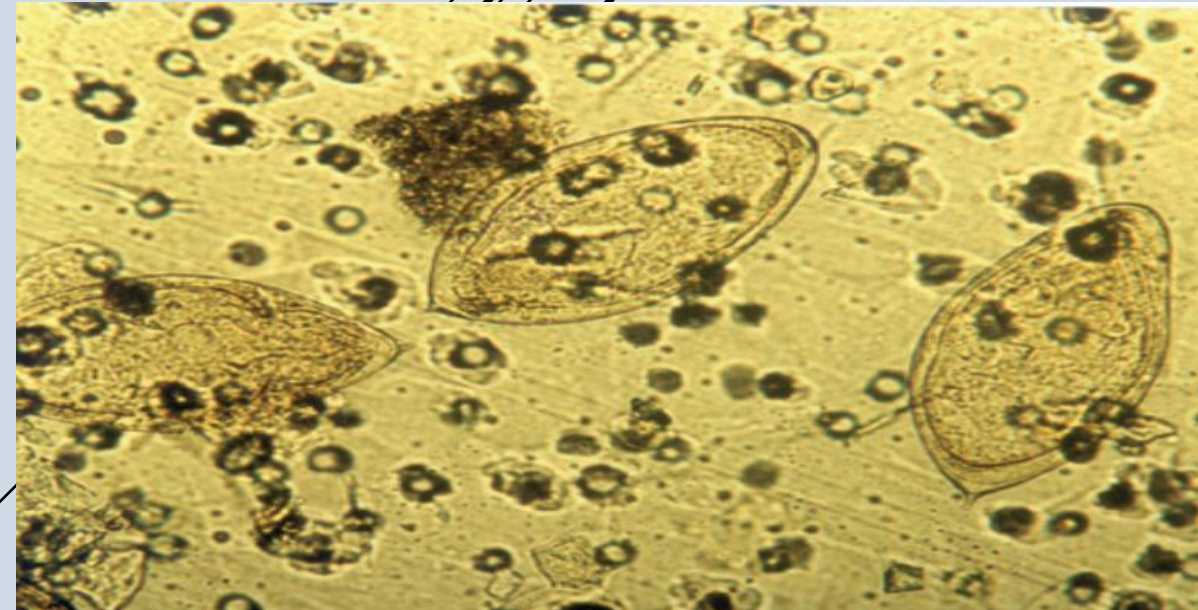


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## Schistosomiasis

### ❖ Investigations

- Microscopic examination of stool or urine for eggs, evaluation of tissue, or serologic tests establish the diagnosis.
- In acute schistosomiasis, leukocytosis and marked eosinophilia may occur.
- Microscopic examination; Characteristic eggs can be identified on smears of stool or urine.
- Quantitative tests that yield  $> 400$  eggs per gram of feces or 10 mL of urine are indicative of heavy infections with increased risk of complications



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## Schistosomiasis

### ❖ Investigations

- In *S. haematobium* infection;
  - Dipstick urine testing shows blood and albumin.
  - The characteristic egg with its terminal spine can be found by microscopic examination of the centrifuged deposit of terminal stream urine.
- In a heavy infection with *S. mansoni* or *S. japonicum*.
  - The characteristic egg with its lateral spine can usually be found in the stool.
- Diagnosis for ova can also be made by biopsy of the rectum, colon, liver, or bladder.

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## Schistosomiasis

### ❖ Investigations

- Serologic tests include an ELISA available that is 99% specific for all species.
- The test is 99% sensitive for *S mansoni*, 95% sensitive for *S haematobium*.
- Serologic tests may become positive before eggs are seen in stool or urine.
- Eggs may be shed in stool or urine for months After therapy .
- The identification of eggs in fluids or tissue or positive serologic tests cannot distinguish past or active disease.

# TREMATODES (FLUKES)

## Schistosomiasis

### ❖ Investigations

- A diagnosis of schistosomiasis, evaluation for the extent of disease is warranted, including ;
  - liver function studies, imaging of the liver, and may Sigmoidoscopy with intestinal disease.
  - Ultrasound or other imaging studies, and Cystoscopy for the urinary system in urinary disease.
  - Ultrasound assesses the urinary tract; bladder wall thickening, hydronephrosis and bladder calcification can be detected.

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## Schistosomiasis

### ❖ Management

- The object of therapy is to kill the adult schistosomes and stop egg-laying.
- Praziquantel is the drug of choice for all forms of schistosomiasis.
  - Produces cure in 80% of treated individuals and over 90% reduction in egg counts.
  - Toxicities uncommon but include abdominal pain, diarrhea, urticaria, headache, nausea, vomiting, and fever, and may be due both to direct effects of the drug and responses to dying worms.
  - Therapy in early infection reverses hepatomegaly, bladder wall thickening and granulomas.



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## Schistosomiasis

### ❖ Management

- The drug may not prevent illness when given after exposure and, for recent infections, a repeat course after a few weeks may be appropriate.
- Praziquantel may be used during pregnancy.
- Resistance to praziquantel has been reported.
- Use of corticosteroids in conjunction with praziquantel in severe disease, may decrease complications.
- Treatment should be followed by repeat examinations for eggs about every 3 months for 1 year after therapy, with re-treatment if eggs are seen.

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## Schistosomiasis

### ❖ Management

- Surgery may be required to deal with residual lesions such as:-
  - Ureteric stricture.
  - Small fibrotic urinary bladders.
  - Granulomatous masses in the brain or spinal cord.
- Removal of rectal papilloma's by diathermy may provide symptomatic relief.

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## Schistosomiasis

### ❖ Prevention

- No single means of controlling schistosomiasis has been established to date.
- The life cycle is terminated if fresh water containing the snail host is not contaminated by ova-containing urine or faeces.
- The provision of latrines and of a safe water supply, remains a major problem in rural areas.
- Population mass treatment annually helps prevent *S. haematobium* and *S. mansoni* infection but so far has had little success with *S. japonicum*.

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## Schistosomiasis

### ❖ Prevention

- Targeting the intermediate host, the snail, is problematic and has not proved successful.
- For personal protection, contact with infected water must be avoided.
- Community control of schistosomiasis includes improved sanitation and water supplies, elimination of snail habitats, and intermittent treatment to limit worm burdens.

# Thank you